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L2-CHEMMR



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Te Mātai Matū, Kaupae 2, 2023

TE PUKAPUKA RAUEMI

Tirohia tēnei pukapuka hei whakatutuki i ngā tūmahi kei ō Pukapuka mō ngā Tūmahi me ngā Tuhinga.

Tirohia kia kitea ai e tika ana te raupapatanga o ngā whārangi 2–5 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

E ĀHEI ANA TŌ PUPURI KI TĒNEI PUKAPUKA HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

Ngā tikanga tātai mō 91164: *Te whakaatu māramatanga ki te honohono, ki te hanganga, ki ngā āhuatanga me ngā huringa pūngao*

$$n = cV \quad \Delta_r H = \sum \text{ngā pūngao hononga} \quad - \sum \text{ngā pūngao hononga}$$

(ngā hononga i motukia) (ngā hononga i hangaia)

$$n = \frac{m}{M}$$

Ngā tikanga tātai mō 91166: *Te whakaatu māramatanga ki te tauhohehohe matū*

$$\text{pH} = -\log[\text{H}_3\text{O}^+] \quad [\text{H}_3\text{O}^+] = 10^{-\text{pH}}$$

$$K_w = [\text{H}_3\text{O}^+][\text{OH}^-] = 1 \times 10^{-14} \text{ i te } 25 \text{ }^\circ\text{C}$$

Formulae for 91164: *Demonstrate understanding of bonding, structure, properties and energy changes*

$$n = cV \quad \Delta_r H = \Sigma \text{ bond energies (bonds broken)} - \Sigma \text{ bond energies (bonds formed)}$$

$$n = \frac{m}{M}$$

Formulae for 91166: *Demonstrate understanding of chemical reactivity*

$$\text{pH} = -\log[\text{H}_3\text{O}^+] \quad [\text{H}_3\text{O}^+] = 10^{-\text{pH}}$$

$$K_w = [\text{H}_3\text{O}^+][\text{OH}^-] = 1 \times 10^{-14} \text{ at } 25 \text{ }^\circ\text{C}$$

TE TAKA PŪMOTU

Te Tau Iraohoho													1	Te Papatipu Molar/g mol ⁻¹													2
													H														He
													1.0														4.0
																										18	
<i>I</i>	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18											
	Li 6.9	Be 9.0									B 10.8	C 12.0	N 14.0	O 16.0	F 19.0	Ne 20.2											
	11	12									13	14	15	16	17	18											
	Na 23.0	Mg 24.3									Al 27.0	Si 28.1	P 31.0	S 32.1	Cl 35.5	Ar 40.0											
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36									
	K 39.1	Ca 40.1	Sc 45.0	Ti 47.9	V 50.9	Cr 52.0	Mn 54.9	Fe 55.9	Co 58.9	Ni 58.7	Cu 63.6	Zn 65.4	Ga 69.7	Ge 72.6	As 74.9	Se 79.0	Br 79.9	Kr 83.8									
	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54									
	Rb 85.5	Sr 87.6	Y 88.9	Zr 91.2	Nb 92.9	Mo 95.9	Tc 98.9	Ru 101	Rh 103	Pd 106	Ag 108	Cd 112	In 115	Sn 119	Sb 122	Te 128	I 127	Xe 131									
	55	56	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86									
	Cs 133	Ba 137	Lu 175	Hf 179	Ta 181	W 184	Re 186	Os 190	Ir 192	Pt 195	Au 197	Hg 201	Tl 204	Pb 207	Bi 209	Po 210	At 210	Rn 222									
	87	88	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118									
	Fr 223	Ra 226	Lr 262	Rf 261	Db 262	Sg 263	Bh 264	Hs 265	Mt 268	Ds 271	Rg 272	Cn 277	Nh	Fl	Mc	Lv	Ts	Og									

Te Raupapa Lanthanide													Te Raupapa Actinide						
57	La 139	Ce 140	Pr 141	Nd 144	Pm 147	Sm 150	Eu 152	Gd 157	Tb 159	Dy 163	Ho 165	Er 167	Tm 169	Yb 173	No 259				
89	Ac 227	Th 232	Pa 231	U 238	Np 237	Pu 239	Am 241	Cm 244	Bk 249	Cf 251	Es 252	Fm 257	Md 258	101 102	102 259				

PERIODIC TABLE OF THE ELEMENTS

<i>I</i>		Atomic number											<i>18</i>						
		1 H 1.0											2 He 4.0						
		Molar mass/g mol ⁻¹																	
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
3	4	Li 6.9	Be 9.0									5	6	7	8	9	10		
11	12	Na 23.0	Mg 24.3									13	14	15	16	17	18		
19	20	K 39.1	Ca 40.1	Sc 45.0	Ti 47.9	V 50.9	Cr 52.0	Mn 54.9	Fe 55.9	Co 58.9	Ni 58.7	Cu 63.6	Zn 65.4	Ga 69.7	Ge 72.6	As 74.9	Se 79.0	Br 79.9	Kr 83.8
37	38	Rb 85.5	Sr 87.6	Y 88.9	Zr 91.2	Nb 92.9	Mo 95.9	Tc 98.9	Ru 101	Rh 103	Pd 106	Ag 108	Cd 112	In 115	Sn 119	Sb 122	Te 128	I 127	Xe 131
55	56	Cs 133	Ba 137	Lu 175	Hf 179	Ta 181	W 184	Re 186	Os 190	Ir 192	Pt 195	Au 197	Hg 201	Tl 204	Pb 207	Bi 209	Po 210	At 210	Rn 222
87	88	Fr 223	Ra 226	Lr 262	Rf 261	Db 262	Sg 263	Bh 264	Hs 265	Mt 268	Ds 271	Rg 272	Cn 277	Nh 277	Fl 277	Mc 277	Lv 277	Ts 277	Og 277
Lanthanide Series		57	58	59	60	61	62	63	64	65	66	67	68	69	70				
		La 139	Ce 140	Pr 141	Nd 144	Pm 147	Sm 150	Eu 152	Gd 157	Tb 159	Dy 163	Ho 165	Er 167	Tm 169	Yb 173				
Actinide Series		89	90	91	92	93	94	95	96	97	98	99	100	101	102				
		Ac 227	Th 232	Pa 231	U 238	Np 237	Pu 239	Am 241	Cm 244	Bk 249	Cf 251	Es 252	Fm 257	Md 258	No 259				

English translation of the wording on the front cover



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Level 2 Chemistry 2023

RESOURCE BOOKLET

Refer to this booklet to answer the questions in your Question and Answer Booklets.

Check that this booklet has pages 2–5 in the correct order and that none of these pages is blank.

YOU MAY KEEP THIS SHEET AT THE END OF THE EXAMINATION.